DHS REGIONAL ANALYSIS WORKSHOP FOR ANGLOPHONE AFRICA

Fertility Patterns and their Determinants in Zambia: Findings from the Zambia Demographic and Health Survey

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The Demographic and Health Surveys (DHS) program assists developing countries to conduct national surveys on population and maternal and child health. The DHS program is implemented by Macro International Inc. in Calverton, Maryland. Additional information may be obtained by writing to: DHS, Macro International Inc., 11785 Beltsville Drive, Calverton, MD 20705, U.S.A. (Telephone 301-572-0200; Fax 301-572-0999).

Fertility Patterns and their Determinants in Zambia: Findings from the Zambia Demographic and Health Survey[1]

1 Country Profile

1.1 BACKGROUND

Zambia is a landlocked country situated in Central Africa south of the equator. It shares borders with eight countries: Malawi to the east, Zaire to the north, Tanzania to the northeast, Angola to the northwest, Mozambique to the southeast, Zimbabwe to the south, Botswana and Namibia to the southwest. Zambia covers an area of 752,614 square kilometres and has a tropical climate with three distinct seasons, a warm and wet season stretching from November to April, a cool-dry season from May to August and a hot-dry season covering September and October. The country's vegetation may broadly be classified as Savannah woodland which consists of various trees, tall grass, shrubs, herbs and other woodlands.

Administratively, Zambia is divided into nine provinces and 57 districts. The country has 73 ethnic groups and seven major tribal groupings: Bemba, Tonga, Lunda, Kaonde, Lozi, Luvale and Nyanja. The country's official language is English. Bemba and Nyanja are the common languages spoken in the two major urban areas, Copperbelt and Lusaka, respectively. The rest of the country uses languages specific to ethnic groups and/or localities.

Politically, Zambia has passed through three different systems of government since political independence from Britain in 1964. For the first eight years following independence (1964-1972) Zambia had a multiparty system of government. This was followed by a one party participatory democracy until 1990. In 1990, Zambia reverted back to a multiparty system through an act of parliament and in 1991 the second era multiparty system of government began.

Table 1.1 Population Trends in Zambia

Year	Population ('000)
1921*	980
1931*	1340
1946*	1680
1956*	2850
1963*	3410
1969	4090
1980	5660
1990	7820

* Source: Census of Africans 1963.
Census of 1969,1980 and 1990 (CSO Lusaka)

[1] The figures presented in this paper may differ very slightly from those that appear in the Zambia DHS final report. The differences are due to adjustments made in the design weights following an examination of the household listing and selection.

1.2 DEMOGRAPHIC PROFILE

Zambia's population has been increasing rapidly over the past three decades. The country has carried out four national censuses since 1963 (Table 1.1). The first census, conducted in 1963, enumerated a total population of 3.41 million. A second national census was carried out in 1969 and the total population at that time was 4.09 million. The 1980 Census of Population and Housing reported a total population of 5.66 million. The most recent national census was carried out in August 1990 and preliminary results indicate that Zambia's population is 7.82 million.

The Zambian population is extremely youthful (Table 1.2). Approximately half of the population is aged less than 15 years. Because the population is so young, the momentum for future population growth is high even if fertility levels decline in the immediate future.

Table 1.2 Percent distribution of the population by age, Zambia 1969, 1980 and 1990

Age group	1969		1980		1990	
	Male	Female	Male	Female	Male	Female
0-14	45	47	49	50	48	50
15-49	52	50	49	47	50	48
65+	3	3	2	3	2	2
Total	100	100	100	100	100	100
N('000)	2070	1990	2890	2770	3980	3840

Source: Census of 1969, 1980 & 1990 (CSO Lusaka).

Zambia is one of the most urbanised countries in Africa. The percent distribution of the population by area of residence and sex is shown in Table 1.3. Preliminary results of the 1990 Census show that, out of a total population of 7.82 million people, 3.3 million (42 percent) live in urban areas. This represents an increase from the previous census. The increase may largely be attributed to rural to urban migration and relatively high fertility levels in urban areas.

Table 1.3 Percent distribution of the population by residence and sex, Zambia 1980 and 1990

Residence	1980		1990	
	Male	Female	Male	Female
Rural	58	61	57	59
Urban	42	39	43	41
Total	100	100	100	100

Source: 1980, 1990 Censuses (CSO Lusaka).

Zambia's population has been urbanising at a very fast rate. Twenty percent of the total population lived in urban areas in 1963. This figure rose to 30 percent in 1969 and 40 percent in 1980. Most of this urbanised population live along the "line of rail" which stretches from Livingstone in Southern Zambia to Chililabombwe in the Copperbelt. Zambia's rural population is sparsely distributed. Unequal regional economic development and a limited and unequal distribution of arable land may have contributed to this pattern of settlement.

1.3 SOCIOECONOMIC SITUATION

Zambia's economy has depended almost exclusively on the mining industry. Until recently the main emphasis in Zambia's economy was on copper revenues. Several years after political independence in 1964, copper prices on the world market were high, local production was equally high and the economy was very buoyant. The government was able to embark on various programmes aimed at both redressing the socioeconomic imbalances created by the colonial political and economic legacy and accelerating improvements in the national economic base and in the quality of life of the people.

Emphasis was placed on the development of new infrastructure such as transportation, communication, and energy. In the social sector, substantial investment outlays were made to expand education at all levels. Most social services and investments in infrastructure were highly subsidised by the government. These programmes led to substantial and positive changes in the standard of living of the people, especially those in urban areas.

Education

Zambia's progress in the field of education has been tremendous. Zambia's education system is a three tier system. It begins with seven years of primary school, followed by a five-year secondary system. The secondary system is divided into two, grades 8-9 and grades 10 through 12. At grade 12 students write their ordinary level examination which allows them direct entry into tertiary education. Zambia's tertiary education is comprised of the universities, teacher training colleges and technical and vocational institutions.

During the 1970s enrolment in primary, secondary and technical education increased by 44, 75 and 46 percent, respectively. Enrolment in teacher training colleges rose by 105 percent and in the University of Zambia by 176 percent. In 1990, Zambia had 3,587 primary schools, 498 secondary schools, 14 teacher training colleges, 14 technical and vocational institutions and 2 universities.

Health

Zambia's health sector expanded at a very rapid rate just after independence. The target was to improve the provision of health services and narrow rural-urban differentials in access to health services (Ministry of Health, 1988). During the period from 1964 to 1980 there was improvement in the provision of health services which coincided with an economic upturn in the country. The health status of the people improved, mortality rates declined, and life expectancy at birth increased. However, the post-independence period of rapid social and economic progress was short-lived. The downturn in the global economy and the consequent worldwide recession that started in the 1970s hit the country hard. This contributed to a decline in the quality of health services.

1.4 ZAMBIA DEMOGRAPHIC AND HEALTH SURVEY (ZDHS)

The 1992 Zambia Demographic and Health Survey (ZDHS) is part of the worldwide DHS programme funded by the United States Agency for International Development (USAID) through Macro International Inc. of Columbia, Maryland (USA). The institutions that participated in the ZDHS are: the University of Zambia (Department of Social Development Studies), the Central Statistical Office, and the Ministry of Health.

The ZDHS was the first survey of its kind to be carried out in Zambia. Fieldwork for the ZDHS started in January 1992 and ended in May of the same year. The survey covered all parts of the country. Data processing started a month after the beginning of fieldwork and was completed in June 1992.

The major aim of the ZDHS is to provide information on fertility, family planning, infant and child mortality, and maternal and child health. Zambia is divided into 9 provinces and 57 districts. The sample was designed to provide estimates with acceptable levels of sampling error for certain key parameters, such as fertility and infant mortality, at the provincial level. The sample is self-weighting within urban areas. The rural segments of Luapula, North-Western, and Western provinces were oversampled. Thus, the sample is not self-weighting at the national level. The unweighted and weighted numbers of women by province are shown in Table 1.4. Due to a relatively small sample size in North-Western province, it has been combined with Western province for most analyses in this report. The percent distribution of women interviewed in each province is also shown in Table 1.4. The greatest number of women were interviewed in Copperbelt and Lusaka provinces. These provinces contain most of the urban population and are the most populous regions and the commercial, industrial, and administrative centres of Zambia.

Table 1.4 Number and percent distribution of women by province, Zambia 1992

Province	Number of women interviewed	Number of women weighted	Weighted percent
Central	565	610	8.6
Copperbelt	1606	1698	24.1
Eastern	658	717	10.2
Luapula	589	480	6.8
Lusaka	1137	1202	17.0
Northern	590	642	9.1
North-Western	387	198	2.8
Southern	947	1026	14.5
Western	581	486	6.9
Zambia	7060	7060	100.0

1.5 BACKGROUND CHARACTERISTICS OF RESPONDENTS

A description of the basic characteristics of the women interviewed in the sample provides the background for interpreting findings of the survey. The percent distribution of the women interviewed by age group is shown in Table 1.5. Two-thirds of the women interviewed were younger than age 30. The young age structure of women has implications for future fertility because even if fertility declines from its current high levels there is still a large number of young people just entering the childbearing years.

Education is one of the most important determinants of a woman's fertility behaviour. The majority of women in Zambia have attained the primary level of education. As seen in Table 1.5, about 60 percent of women interviewed had attained primary education and 22 percent had attained secondary education. Approximately half of the respondents lived in urban areas and half in rural areas.

The percent distribution of women with different levels of education by area of residence is shown in Table 1.6. Over 80 percent of women with secondary or higher education lived in urban areas, while four-fifths of women with no education lived in rural areas.

Figure 1.1 shows the percent distribution of women by marital status. The majority of the women interviewed were married, 25 percent had never married and 11 percent were not living with a man due to either divorce, widowhood, or separation.

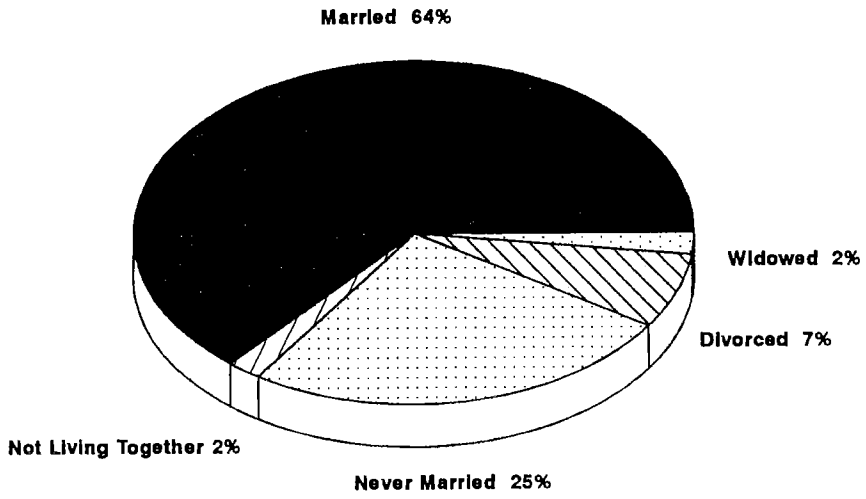
Table 1.5 Percent distribution of women by background characteristics, Zambia 1992

Background characteristic	Percent	Weighted number
Age		
15-19	28.0	1978
20-24	20.4	1439
25-29	16.7	1178
30-34	13.0	917
35-39	9.3	657
40-44	7.2	508
45-49	5.4	384
Education		
None	16.7	1178
Primary	59.9	4227
Secondary	21.7	1534
Higher	1.7	121
Residence		
Urban	50.1	3540
Rural	49.9	3520

Table 1.6 Percent distribution of women by level of education, according to residence, Zambia 1992

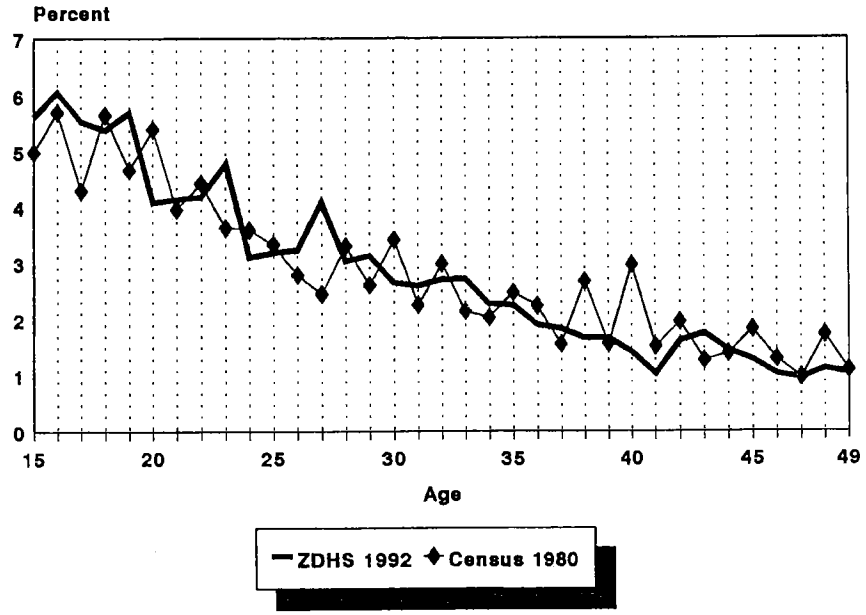
Level of education	Urban	Rural	Total	N
None	21.0	79.0	100	1178
Primary	46.5	53.5	100	4225
Secondary	80.5	19.5	100	1534
Higher	85.5	14.5	100	121

Figure 1.1
Percent Distribution of Women by Marital Status



ZDHS 1992

Figure 2.1
Single-Year Age Distribution of Women



ZDHS 1992 & CSO 1985

2 Quality of Data

In order to make accurate fertility estimates, reliable information on women's date of birth, the dates of birth of children, age at marriage, and the number of children ever born alive to the women are necessary. The quality of ZDHS data is reviewed in this section.

2.1 REPORTING OF AGE OF WOMEN

An accurately reported age distribution will typically have successive ages contributing a constantly declining proportion of the total population in the absence of age selective net migration. Typical age distributions in a society at a low level of development have high peaks and low troughs in the percentages of women reporting at some ages. This is because in societies where age is not well known there is a tendency to report ages ending in digits 0 and 5. The percentage of women reporting at each single year of age in the ZDHS is shown in Figure 2.1.

There are four peaks between the ages of 15 and 29 years. They are at ages 16, 19, 23, and 27 years. These peaks are not particularly high, however, and the reasons they occur are not clear. These are different from the peaks observed in the 1980 Census of Population and Housing for Zambia (See Figure 2.1). Figure 2.1 indicates that the quality of age reporting in the ZDHS is fairly good when compared to the 1980 Census of Population and Housing. The small trough in the proportion of women at age 15 may have occurred because women younger than 15 were not eligible to be interviewed. It is possible that some females age 15 were recorded as less than 15 years by the interviewers to reduce their workload.

Examination of Figure 2.1 suggests that the quality of age reporting is poorer among women younger than 30 years than among older women. One would expect that the quality of age reporting would be poorer among the older women because older women have lived in a society where numeric age had little meaning. The younger women have lived in a society where knowledge of numeric age is much more important. They also are more likely to be educated. Although young women are more likely to know their age, they may also be more likely to misstate it in order not to give away their true age. The relatively better age reporting by the older women may be a result of the probing skills of the highly trained ZDHS interviewers.

Other analyses not shown here suggest that there is little difference in the quality of age reporting between urban and rural females. By level of education age reporting is poorest for females with primary education especially at ages less than 29 years. Age reporting is very good for females with higher education followed by women with secondary education.

2.2 REPORTING OF NUMBER OF BIRTHS

In a society which has been experiencing high fertility for some time the number of births will increase as the number of females in the reproductive age range increases. Thus, the number of births at a later period will be higher than at an earlier period. The number of births reported for each year by the females interviewed in the ZDHS is shown in Figure 2.2. There are many fewer births recorded for 1971, 1987 and 1988 than the years immediately following them. The deficit of births in 1971 is probably the result of women rounding off the ages of children born in 1971 to 1970. The deficit of births recorded for 1988 and 1987 accompanied by a peak in births in 1986 may be the result of interviewers pushing births from 1988 and 1987 to 1986; this would reduce the interviewers' workload since detailed information is collected in the ZDHS on births since January of the fifth calendar year prior to the survey (1987).

Figure 2.2
Number of Births by Calendar Year

The displacement of births can distort retrospective analysis of the ZDHS birth history data. To overcome this defect, the Demographic and Health Surveys programme recommends analysis of fertility data for four-year periods instead of the usual five-year periods. The use of four-year rates should minimise the effects of displacement since, for most of the children, shifting their birth date will not cause them to be transferred across the boundary; i.e., most of the shifting should take place within the period 4-7 years prior to the survey (Arnold and Blanc, 1990).

2.3 COMPLETENESS OF REPORTING DATE OF BIRTH

Respondents were asked to report their month and year of birth and their current age, as well as the month and year of birth of all of their children and the current age of their living children. When they gave incomplete information on date of birth, the missing information was imputed. Partial information about the date of birth (such as the year of birth or the child's current age) was used to set constraints on the logical range of birth dates for imputation (Arnold, 1990). Other unreported information, such as the date of marriage, was similarly imputed by using the available information to set constraints on the logical range within which to impute a value.

Table 2.1 indicates the completeness of reporting of dates of birth for female respondents and their children. A higher proportion of complete dates were reported for women's date of birth than for children's dates of birth. In total, 88 percent of females reported a complete date for their own birth, while a complete date was reported for only 69 percent of their children. This differential is unusual in that typically women's dates of birth are not reported as well as those of their children for whom there is often a document, such as a birth registration certificate or vaccination card, to verify the birth date.

Table 2.1 Completeness of reporting of date of birth for women and children, Zambia 1992

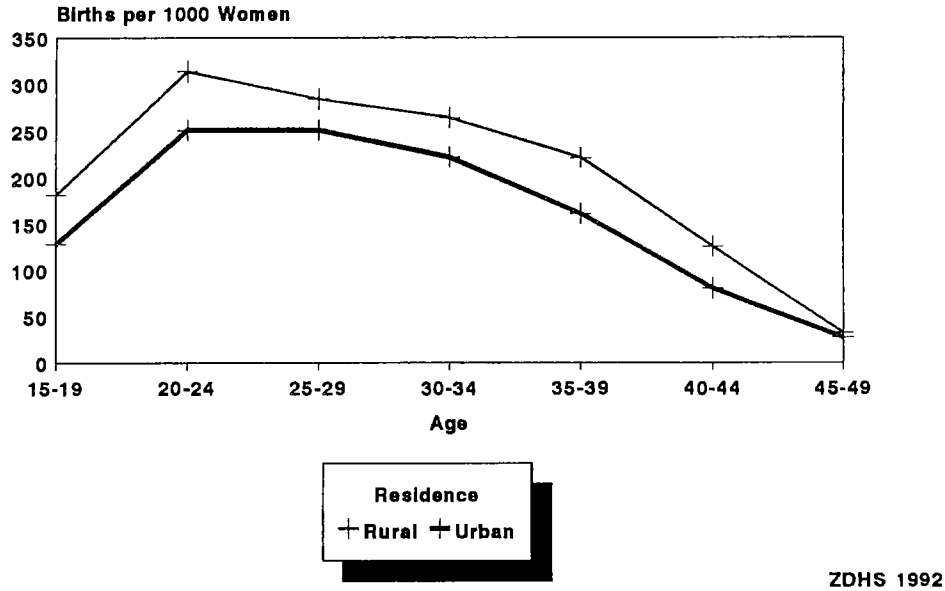
Information reported	Number	Percent
Women		
Month and year	6215	88.0
Month and age	1	0.0
Year and age	843	11.9
Total	7060	100.0
Children		
Month and year	22718	69.1
Month and age	1242	3.8
Year and age	2849	8.7
Year only	1577	4.8
Age only	1616	4.9
Month only	1333	4.1
None	1550	4.7
Total	32884	100.0

3 Fertility

Fertility rates presented in this paper are based on the birth history data collected in the Zambia DHS questionnaire. First, each woman was asked questions about the number of sons and daughters living with her, the number living elsewhere and the number who had died. Next, a complete birth history (live births) was collected, including the sex and date of birth of each child and its survival status. At the end of the birth history section of the questionnaire, there is a final check to ensure that the number of births in the birth history is equal to the reported number of children ever born.

Age-specific fertility rates (ASFRs) were calculated from the birth history by dividing the number of births to women in a specified age group during a specified time period by the number of women-years of exposure during the same period. Total fertility rates (TFRs) are calculated by summing the age-specific fertility rates for five-year age groups and multiplying by five. The total fertility rate represents the number of children an average woman would have between the ages of 15 and 49, if the woman experienced the age-specific rates observed during the period for which the rate is calculated. The total fertility rate is a synthetic cohort measure and thus does not represent the experience of any real age cohort.

Figure 3.1
Age-Specific Fertility Rates by Residence for the Four-Year Period Prior to the Survey



3.1 CURRENT FERTILITY

Age-specific fertility rates and total fertility rates for the period 0-3 years prior to the survey for the whole country, and for rural and urban areas are shown in Table 3.1. The highest ASFR is found among the 20-24 year age group. As shown in Figure 3.1, rural ASFRs 0-3 years prior to the survey peak in the 20-24 year age group, while in the urban areas the rates peak and are identical among women age 20-24 and 25-29.

Total fertility rates for women aged 15-49 years by background characteristics are shown in Table 3.2. There is a large difference in fertility by urban-rural residence; the TFR in urban areas is 5.6 children compared to 7.1 in rural areas, a difference of 1.5 children. By province, fertility rates range from 5.4 children per woman in Lusaka, a predominantly urban province, to 8.0 children per woman in Northern, a predominantly rural province. Higher rates are found in provinces which are predominantly rural, like Luapula, Northern, Southern, Eastern and Central. The low total fertility rate observed for North-Western and Western provinces, which are predominantly rural, is exceptional and may either be due to

Table 3.1 **Age-specific and total fertility rates by residence for the four years prior to the survey, Zambia 1992**

Age group	Urban	Rural	Total
15-19	128	181	154
20-24	251	314	281
25-29	251	284	267
30-34	222	264	242
35-39	161	221	191
40-44	81	126	110
45-49	28	33	31
TFR	5.61	7.12	6.38

Note: Rates are calculated for period 1-48 months prior to the interview. Rates for the age group 45-49 years are partially truncated.

high levels of natural infecundity or pathological sterility.

There are also significant differences in fertility between women with different levels of education. The largest difference is between women with no education, whose TFR is 7.2, and women with higher education, whose TFR is 4.1. It is likely that women with higher education spend more time in school and thus delay marriage and childbearing. As will be seen in a subsequent section, they are also more likely than other women to use effective contraceptive methods to space or limit their births.

Table 3.2 Total fertility rates by background characteristics, Zambia 1992

Background characteristic	Total fertility rates
Residence	
Urban	5.61
Rural	7.12
Province	
Central	6.79
Copperbelt	5.96
Eastern	6.79
Luapula	7.18
Lusaka	5.36
Northern	7.99
Southern	6.97
N/Western & Western	5.83
Education	
None	7.15
Primary	6.67
Secondary	4.96
Higher	4.05
Total	6.38

3.2 CHILDREN EVER BORN

The number of children ever born (CEB) to all women aged 15-49 years is another measure of fertility. In the Zambia DHS survey questionnaire the total number of children ever born was collected by a sequence of questions which were designed to maximise memory recall. In many surveys and censuses, information on CEB can be underestimated due to omission of births, especially among the oldest women in the sample or population. Table 3.3 shows the percent distribution of women by number of children ever born, according to age and background characteristics.

Table 3.3 Percent distribution of all women by number of children ever born, according to age, Zambia 1992

	Number of children ever born								
Age	0	1	2	3	4	5	6+	Total	N
15-19	72.8	22.6	4.0	0.6	-	-	-	100.0	1978
20-24	20.3	29.6	28.8	15.3	5.1	0.8	0.2	100.0	1439
25-29	8.2	11.3	16.3	23.5	20.0	12.8	8.1	100.0	1178
30-34	3.9	4.4	7.7	11.6	15.6	17.7	39.1	100.0	917
35-39	2.0	2.7	3.8	5.4	8.5	11.9	65.7	100.0	657
40-44	1.4	1.8	3.9	3.2	6.9	9.8	73.0	100.0	508
45-49	1.5	2.6	2.7	2.8	3.6	5.4	81.5	100.0	384
Total	26.8	15.3	11.5	9.6	7.9	6.7	22.3	100.0	7060

Among women aged 15-19, 27 percent have one or more children ever born. By age 20-24, 80 percent of women have had a child, 30 percent have had one child and 50 percent have had two or more children.

Among women aged 45-49, more than 80 percent have given birth to 6 or more children.

3.3 FERTILITY TRENDS

Age-specific fertility rates for four-year periods prior to the survey are shown in Table 3.4 and Figure 3.2. The rates suggest a consistent trend toward fertility decline in Zambia over the last fifteen years. The decline has occurred among all age groups, but is greatest among teenagers and women aged 40 and over. Among teenagers, the age-specific fertility rate has declined by 23 percent over the period from 12-15 to 0-3 years preceding the survey. Over the same period, age-specific fertility rates among women aged 40-44 have declined by 28 percent, while in the age groups 20-39, the declines range from 13 to 21 percent.

Table 3.4 **Age-specific and cumulative fertility rates for four-year periods preceding the survey, Zambia 1992**

Maternal age at birth	Years preceding the survey			
	0-3	4-7	8-11	12-15
15-19	154	163	187	199
20-24	281	290	307	322
25-29	267	293	310	313
30-34	242	256	284	290
35-39	191	224	[238]	[242]
40-44	110	[139]	[154]	[154]
45-49	[31]	[50]	-	-
Cumulative fertility 15-34	4.72	5.01	5.43	5.62

Age-specific fertility rates cumulated up to age 34 have dropped from 5.62 births per woman during the period 12-15 years prior to the survey to 4.72 during the four years prior the survey.

Figure 3.2
Age-Specific Fertility Rates for Four-Year Periods Prior to the Survey

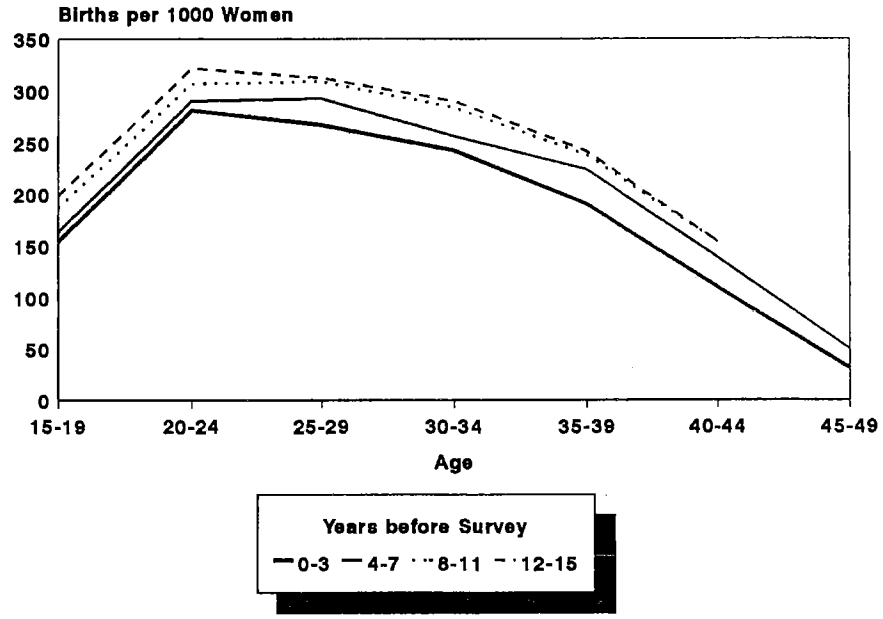
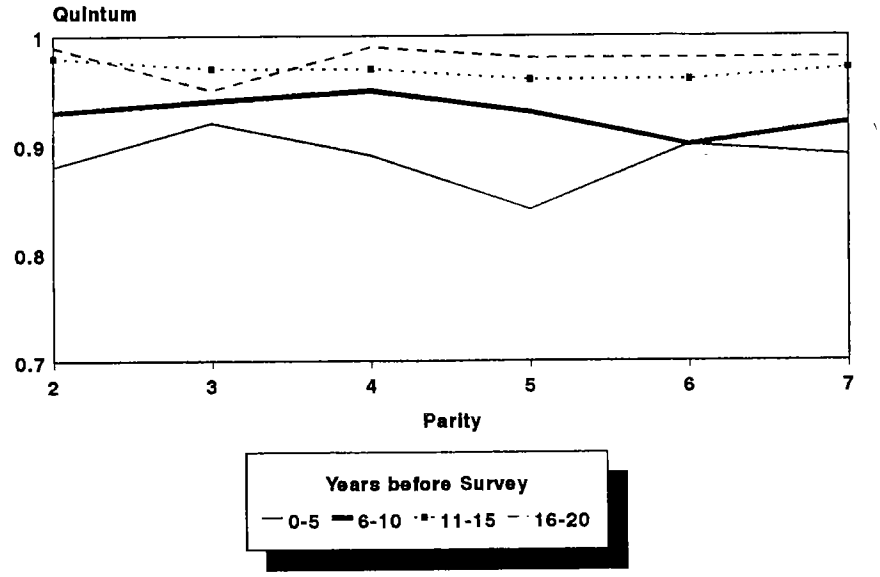


Figure 3.3
Proportion of Women having a Birth within Five Years of a Previous Birth



3.4 PARITY PROGRESSION RATIOS

A parity progression ratio is the proportion of women at parity i who go on to parity i+1. Parity progression ratios are useful for detecting changes in fertility, particularly when birth dates are not well reported. The proportions of women at parity i who have another birth within five years (quintum) have been calculated from the ZDHS birth history data using life table techniques. The quintum is an approximation of the proportion of women who will eventually close the birth interval. Table 3.5 and Figure 3.3 show parity progression ratios for four time periods prior to the survey.

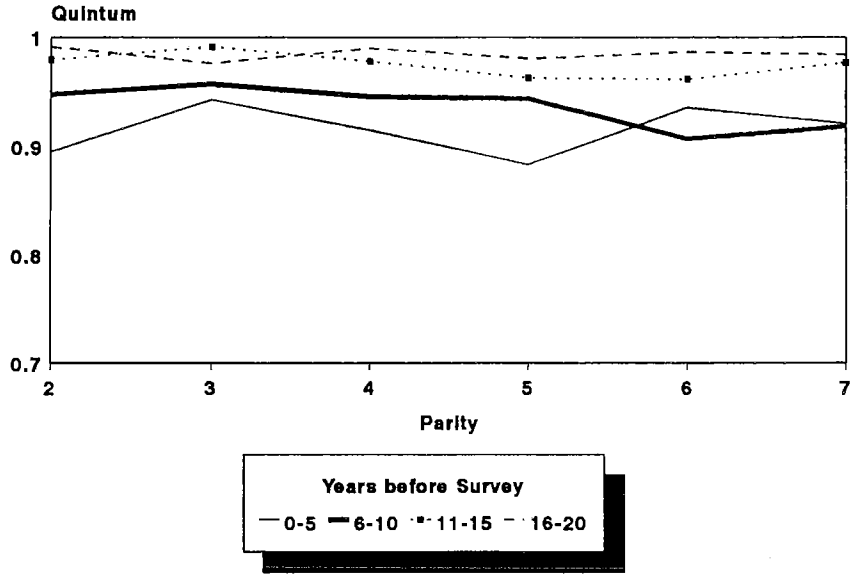
Table 3.5 Proportion of women at parity i who have a birth within five years of a previous birth (Quintum), Zambia 1992

Years prior to survey	Parity i+1					
	2	3	4	5	6	7
0-5	0.87	0.92	0.89	0.84	0.90	0.89
6-10	0.93	0.94	0.95	0.93	0.90	0.92
11-15	0.98	0.97	0.97	0.96	0.96	0.97
16-20	0.99	0.95	0.99	0.98	0.98	0.98

Figure 3.3 shows that fertility had been constantly high and stable in the 11-15 and 16-20 years before the survey. Some decline in the quintums is observed in the period 6-10 years before the survey, especially for transition to parity two and to parities five and higher. The estimates for the most recent period are substantially lower than previous estimates for most parities. The decline is most evident at parities four and five.

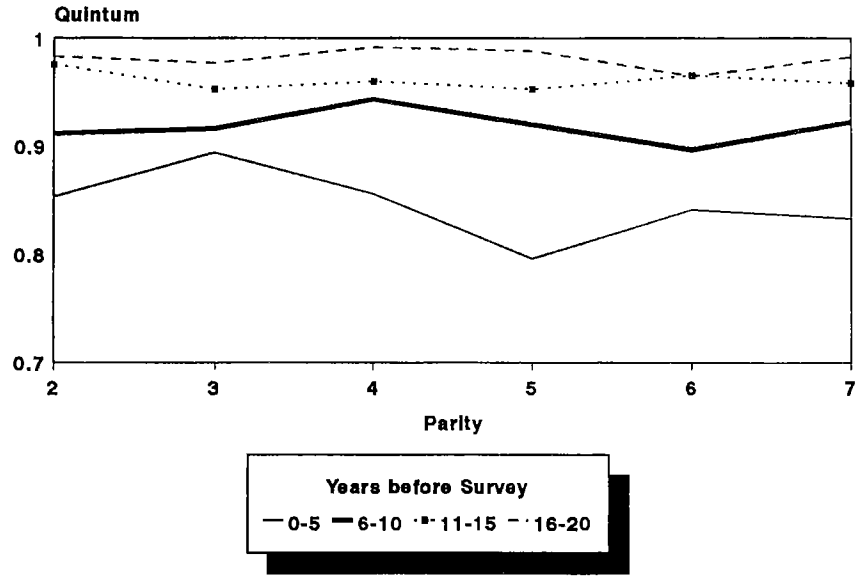
The proportion of women having a birth within five years of the previous birth calculated for urban and rural areas separately are shown in Figures 3.4 and 3.5. Both rural and urban areas show a decline in fertility in the most recent period, although the decline for urban areas is greater. In addition, it appears that the decline in urban areas began earlier than in rural areas.

Figure 3.4
Proportion of Women having a Birth within Five Years of a Previous Birth Rural Zambia



ZDHS 1992

Figure 3.5
Proportion of Women having a Birth within Five Years of a Previous Birth Urban Zambia



ZDHS 1992

4 Proximate Determinants of Fertility

To improve the understanding of the causes of fertility variation it is necessary to analyze the mechanisms through which socioeconomic variables influence fertility. Davis and Blake (1956) referred to these mechanisms as the intermediate fertility variables. Later, Bongaarts developed a model which quantifies the impact of the Davis-Blake variables on fertility (Bongaarts, 1978; Bongaarts and Potter, 1983). In the model, the following fertility rates are defined:

(i) The total fertility rate (TFR). This is the number of births a woman would have at the end of the reproductive period if she were to bear children at prevailing age-specific fertility rates while living through the entire reproductive period;

(ii) The total marital fertility rate (TMFR). This is the number of births a woman would have at the end of the reproductive years if she were to bear children at prevailing age-specific marital fertility rates and remain married during the entire reproductive period;

(iii) The total natural marital fertility rate (TN). This is equal to the total marital fertility rate in the absence of contraception and induced abortion;

(iv) The total fecundity rate (TF). This is the total natural fertility rate in the absence of lactational and postpartum abstinence. In other words, it is a biological maximum value.

The model rests on the fact that TF will always exceed TN, which in turn will always exceed the TMFR which will exceed the TFR. Thus, the following set of equations can be written:

$$TN = TF*C_i$$
$$TMFR = TN*C_c*C_a$$
$$TFR = TMFR*C_m$$

where C_i is an index of the length of postpartum infecundability, C_c is the index of contraception, C_a is an index of induced abortion and C_m is an index of the prevalence of marriage. All these indices take values between 0 and 1. The indices are equal to 1 if the fertility-inhibiting effect of the component to which they refer is nonexistent and equal to 0 if the fertility-inhibiting effect of this component is total. The summary of the above three equations is:

$$TFR = TF*C_i*C_c*C_a*C_m$$

The four indices therefore measure the way in which each of the following four components:

1. the amount of postpartum infecundability,
2. the use of contraception,
3. the use of induced abortion, and
4. the prevalence of marriage,

reduce fertility from its biological maximum. The relative values of the four indices tell us the relative importance of each of the components in reducing fertility. The Bongaarts model has been applied to examine the effect of contraception, marriage, and postpartum infecundity in generating observed fertility levels and differentials in Zambia based on the ZDHS data.

Table 4.1 shows the components of the Bongaarts model, the contraceptive prevalence rates, the mean insusceptibility periods and TFRs by background characteristics. The abortion index is not estimated because there is no information on the prevalence of abortion available from the Zambia DHS. It can be noted from Table 4.1 that the implied total fecundity rates (TF) for all categories of background characteristics are lower than that given by Bongaarts (15.3). This could imply that abortions contribute significantly to reducing total fecundity. Although abortions are illegal in Zambia, except on medical grounds, there is anecdotal evidence of a high number as indicated by the high number of illegal abortion complication cases recorded in the hospitals (Castle et al., 1990). In addition, in North-Western and Western provinces where, as mentioned earlier, women may have unusually high levels of sterility, the TF is unusually low at 11.4.

Table 4.1 Indices of Bongaarts' model and related measures, Zambia 1992

Background characteristic	Indices			Total fertility 4 years before survey	Implied fecundity	Mean insusceptibility period (months)	Contraceptive prevalence[1] (percent)
	C_i	C_c	C_m				
Zambia	0.63	0.88	0.91	6.4	12.6	13	12.6
Residence							
Urban	0.67	0.81	0.88	5.6	11.7	11	19.0
Rural	0.61	0.93	0.94	7.1	13.4	15	7.0
Education							
None	0.59	0.95	0.95	7.2	13.3	15	5.0
Primary	0.63	0.90	0.94	6.7	12.5	13	11.1
Secondary	0.68	0.73	0.84	5.0	12.0	11	25.7
Higher	0.79	0.51	0.93	4.1	10.9	7	57.3
Province							
Central	0.65	0.92	0.94	6.8	12.1	12	8.3
C/belt	0.66	0.83	0.89	6.0	12.3	12	16.5
Eastern	0.61	0.94	0.95	6.8	12.5	14	6.4
Luapula	0.62	0.93	0.94	7.2	13.3	14	6.5
Lusaka	0.65	0.78	0.88	5.4	12.1	13	22.6
Northern	0.60	0.85	0.94	8.0	16.7	15	16.3
Southern	0.64	0.92	0.94	7.0	12.6	13	7.5
N/Western & Western	0.60	0.93	0.91	5.8	11.4	15	7.3

[1] Does not include "other" methods

Another way of presenting the results from the model is to express the contribution of each index as a percentage of total fecundity (Adlakha et al., 1991). The results of this calculation are shown in Table 4.2. The table shows that there are differences according to background characteristics in the importance of the indices in reducing total fecundity from its maximum. For Zambia as a whole, postpartum infecundity accounts for 37 percent, followed by contraception at 7 percent and marriage at 5 percent. In rural Zambia, postpartum infecundability accounts for 39 percent of TF compared to urban Zambia where it accounts for only 33 percent. Contraception accounts for 4 percent of the TF in rural Zambia compared to 13 percent in urban Zambia and marriage accounts for 3 percent of TF in rural Zambia compared to 6 percent in urban Zambia. The differences in the indices between rural Zambia and urban Zambia imply that women breastfeed and abstain longer, contracept much less and get married earlier in rural Zambia than in urban Zambia.

Differences in current levels of fertility by level of education and province can also be examined using this approach. A significant difference between the women with low fertility and women with high fertility is the percent of TF accounted for by contraception. For example, contraception accounts for 18 and 39 percent of TF for women with secondary and higher education, respectively, while it accounts for 6 percent or less among those with no or primary education.

Table 4.2 Percent contribution of the proximate determinants to total fecundity, Zambia 1992

Background characteristic	TFR	Postpartum infecundability	Contraception	Marriage	Total
Zambia	51	37	7	5	100
Residence					
Urban	48	33	13	6	100
Rural	53	39	4	3	100
Education					
No education	54	41	3	3	100
Primary	53	37	6	3	100
Secondary	42	32	18	8	100
Higher	37	21	39	3	100
Province					
Central	56	35	5	4	100
Copperbelt	49	34	11	6	100
Eastern	54	39	4	3	100
Luapula	54	38	4	4	100
Lusaka	45	35	14	6	100
Northern	48	40	9	3	100
Southern	55	36	5	4	100
North-Western and Western	51	40	4	5	100

Note: Contribution of each proximate determinant has been computed based on indices in Table 4.1

5 Transition to First Marriage and First Birth

Marriage and childbearing in African societies are seen as important and obligatory stages in the transition from childhood to adulthood. The majority of women are married within a few years after attaining puberty and most births take place within marriage. As a result, the proportion of females ever married and their age at marriage have significant implications for fertility levels as they determine the percentage of females exposed to childbearing and the duration of that exposure. A comparative analysis of Demographic and Health Surveys and World Fertility Survey data shows that declines in fertility in many Asian and North African countries started because of delayed age at marriage, followed by an increase in the use of contraception, while age at marriage continued to increase (Adlakha et al., 1991).

The percentage of females ever married by five-year age groups in 1969, 1980 and 1992 are indicated in Table 5.1. There was a significant decline in the percentage of females ever married in the age groups 15-19 and 20-24 years between 1969 and 1980 but this decline did not continue between 1980 and 1992. This pattern may be related to the slowdown in urbanization of the female population between 1980 and 1990.

The increase in the median age at marriage across age cohorts is shown in Figure 5.1.[2] The figure shows that women in each birth cohort have been progressively marrying later. The importance of marriage for fertility is in its impact on increasing exposure to pregnancy. However, it can not necessarily be concluded that since women have been marrying later, they also have been having their births later. While there has been a rapid increase in the median age at marriage starting with the birth cohort 1962-1958 to the birth cohort 1977-1973, the median age at first childbirth has increased less rapidly across the same birth cohorts. As a result, the gap between the median age at first marriage and the median age at first childbirth has narrowed.

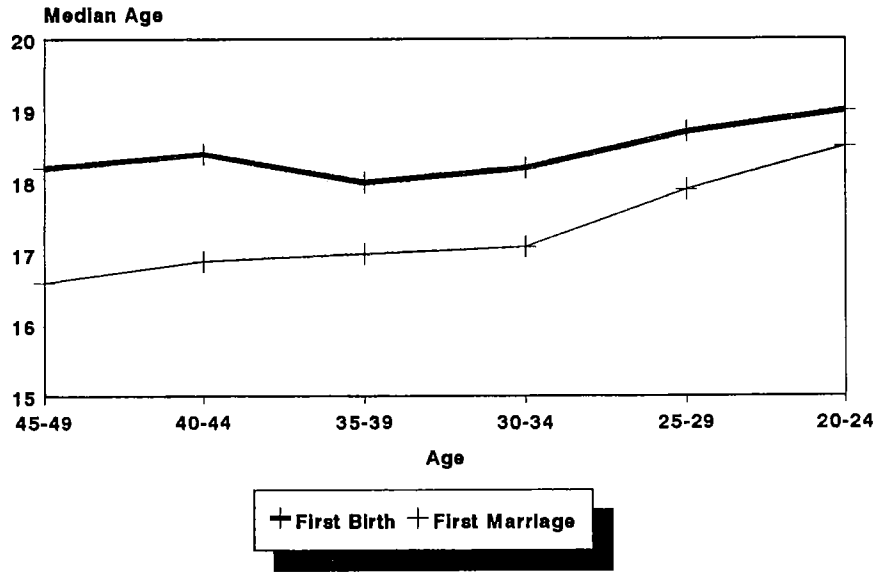
Table 5.1 Percentage of females ever married by age, Zambia 1969, 1980 and 1992

Age group	Proportion of females ever married		
	1969	1980	1992
15-19	42	32	30
20-24	91	80	79
25-29	96	92	94
30-34	98	96	98
35-39	98	97	99
40-44	98	97	100
45-49	98	97	100

Sources: 1969 and 1980 figures are from Census of Population and Housing 1980 Final Report Vol III. 1992 figures are from the Zambia DHS 1992.

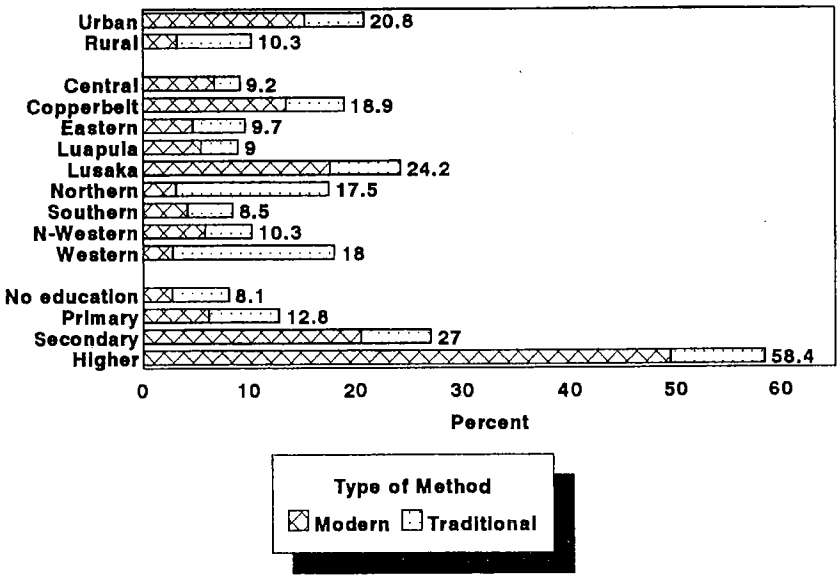
[2] The medians shown are based on life tables.

Figure 5.1
Median Age at First Marriage and First Birth by Age



ZDHS 1992

Figure 6.1
Percent of Married Women Using Contraception by Type of Method



ZDHS 1992

6 Fertility Regulation and Reproductive Preferences

6.1 CONTRACEPTIVE KNOWLEDGE AND USE

Knowledge of family planning methods and service providers are preconditions for the use of contraceptives. To determine women's knowledge of contraception, the ZDHS questionnaire first asked respondents to name any methods that a couple can use to delay or avoid pregnancy. For any methods the respondent did not spontaneously mention, the interviewer described the method and the respondent was asked if she recognised it. Descriptions for seven modern methods (pill, IUD, injections, vaginal methods, condom, female sterilisation and male sterilisation) and two traditional methods (natural family planning and withdrawal) were included.

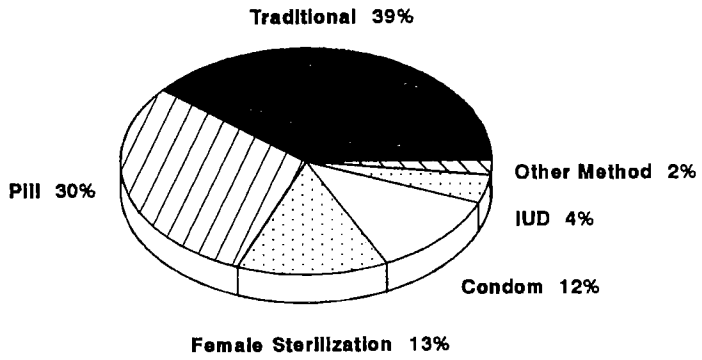
The level of awareness of family planning and particularly modern methods of family planning is relatively high in Zambia. Results from the Contraceptive Prevalence Survey (1988) showed that about 60 percent of all the women interviewed had heard of family planning; in the ZDHS, approximately 90 percent of the respondents had heard of at least one method.

The contraceptive prevalence rate (CPR) among married women in Zambia is about 15 percent. This rate is relatively low compared to countries like Zimbabwe (43 percent), Kenya (26 percent) and Botswana (30 percent). Figure 6.1 shows the percentage of married women using contraception by background characteristics. Approximately twice as many urban dwellers as rural dwellers use contraception. Contraceptive use increases dramatically with increasing levels of education, from 8 percent among women with no education to 58 percent among those with higher education. Among the regions, contraceptive prevalence is between 18 and 24 percent in Lusaka, Copperbelt, Western and Northern regions, while it is 9-10 percent in the remaining regions.

Figure 6.2 shows that about 60 percent of current users of contraception use modern methods. The pill is the most commonly used modern method, followed by female sterilisation and the condom. Family planning organisations, like the Planned Parenthood Association of Zambia (PPAZ) and Mindolo Ecumenical Foundation, are vigorously campaigning for increased use of the condom to prevent the spread of AIDS. Traditional methods are withdrawal, natural family planning (rhythm), herbs, strings and others. About 39 percent of current users use a traditional method.

As shown in Table 6.1, contraceptive use is most prevalent among women aged 35-39; 19 percent of these women use family planning. Contraceptive prevalence is lowest among women aged 15-19 (7 percent) and 45-49 (10 percent). Among women under age 40, the pill and withdrawal account for more than half of all contraceptive use. Among contraceptive users age 40-49, more than half are sterilised.

Figure 6.2
Percent Distribution of Contraceptive Users by Method



ZDHS 1992

Table 6.1 Percentage of currently married women using specific methods by age, Zambia 1992

Age group	Percent using						
	Pill	IUCD	Diaphragm	Condom	Sterilisation	Natural FP	Withdrawal
15-19	1.8	0.0	0.0	1.6	0.0	0.4	3.4
20-24	4.3	0.1	0.0	3.0	0.1	0.7	3.5
25-29	6.0	0.4	0.0	1.8	0.2	1.3	3.2
30-34	5.5	1.3	0.4	2.0	1.3	0.9	3.1
35-39	6.1	0.2	0.4	1.0	6.3	1.4	4.0
40-44	1.6	1.0	0.3	0.8	7.2	1.0	1.2
45-49	1.0	3.0	0.0	0.0	5.2	0.0	0.4
Total	4.3	0.4	0.1	1.8	2.1	0.9	3.0

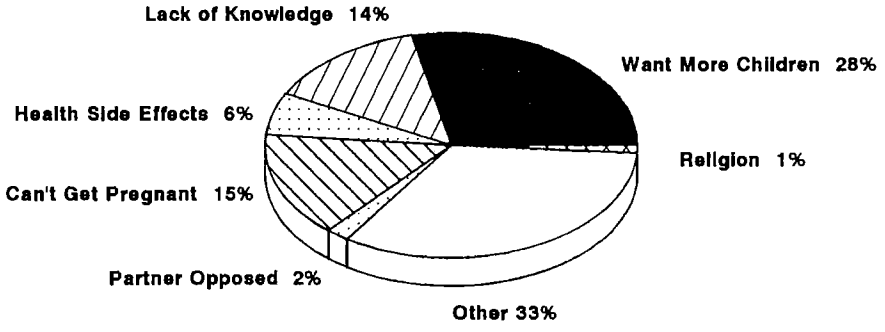
6.2 NONUSE OF CONTRACEPTION

Of all women interviewed in the Zambia DHS survey who were not using any method to delay or avoid pregnancy, 43 percent intended to use a method in future and 47 percent were not intending to use any method in the near future. Ten percent did not know their future intentions. The most preferred method of contraception among those who intend to use is the pill. This method is the preferred of almost 60 percent of all women who intend to use a method in the future. A reasonably high proportion of current nonusers intend to use a traditional method of contraception. The IUD and other modern contraceptive methods were the least preferred. Eleven percent of women were not sure which method to use though they intend to use a method in the future.

Of the women who did not intend to use a method of contraception, 28 percent said it was because they wanted more children, 14 percent did not intend to use due to a lack of knowledge, 15 percent said that they couldn't get pregnant and 2 percent did not intend to use due to their partners opposition (Figure 6.3).

These results have implications for policy in terms of unmet need for contraception, educational campaigns for partners about the advantages of contraceptive use and health problems of the women.

Figure 6.3
Percent Distribution of Non-Users of Contraception Who Do Not Intend to Use Contraception by Reason



7 The Determinants of Fertility Differences in Zambia

In Section 3 it was shown that fertility has declined in all regions and among all subgroups in Zambia, although the pace of fertility decline has differed. What has determined the differences in the pace of fertility decline and the differences in fertility levels among regions and sub-groups? Age at marriage, education levels of women and husbands and region of residence generally affect the level of fertility at the macro level (van de Walle and Foster, 1990). However, the impact of these factors on fertility is variable. Cleland and Rodgríguez (1988) undertook a comparative analysis of the relationship between education (both male and female) and marital fertility in a cross-section of World Fertility Survey (WFS) countries using individual level data. Although they found substantial variation in the patterns observed in different regions of the world they found little variation among countries within any given region. Thus, although there was a clear negative relationship between education and fertility in Latin America, the relationship in Asia and Africa was less clear with the highest marital fertility often found among women with a few years of schooling. In the same study the effects of fertility determinants other than education were ambiguous.

The implication from these studies is that the impact of women's and men's levels of education, region of residence and age at marriage cannot be generalised across societies. The influence of these variables operates through societal and cultural factors which are difficult to quantify. The Caldwells have postulated the influence of a number of cultural factors on fertility, although many of their propositions have been questioned (van de Walle and Foster, 1990). In this section, we will examine whether age at marriage, education and region of residence have a significant impact on fertility differences in Zambia.

In order to determine which factors most influence fertility differences in Zambia, multiple and logistic regression models have been fitted. Two multiple regression models to predict the number of children ever born to women 15 to 49 years and women 35 years and above were fitted. We also fitted logistic regression models to predict the probability of using a contraceptive method, the probability of having a birth in the period 1990-1992 and the probability of marrying before 18 years of age. For reference, the regression coefficients and their standard errors are presented in Appendix A.

Based on the results of the models, we calculated predicted values of each of the dependent variables for categories of the independent variables. These predicted values are presented in Tables 7.1-7.3. The predicted values for each category of an independent variable are calculated net of each of the other variables in the equation; the other variables are assigned their mean value.

7.1 SELECTION OF VARIABLES

The dependent variable children ever born to women 15-49 years was selected to represent the average fertility of women by the middle of their reproductive years, while the dependent variable children ever born to women age 35 years and older was selected to represent the fertility of women who had completed or were close to completing childbearing. The probability of having a birth in the two years before the survey (1990-1992) has been selected as a measure of current fertility. The independent variables have been selected on the basis of differences in fertility between regions and sub-groups shown in Section 3, indications from the Bongaarts model in Section 5 that differences in age at marriage and differences in the level of use of contraception account for fertility differences between regions and sub-groups.

The probability of marrying before 18 years has been selected because the median age at marriage for all women in Zambia from the ZDHS data is 18 years. Before identifying policies to raise the median age at marriage, it is necessary to identify women who are most likely to marry before 18 years. The probability of using a contraceptive and the probability of marrying before 18 years for women of given characteristics were selected on the basis of indications in the Bongaarts model that marriage and use of contraceptives were

important in determining the level of fertility. The independent variables were selected because there are differences in the age at marriage and contraceptive use by region and background variables.

7.2 RESULTS FROM THE FERTILITY MODELS

In Table 7.1, it is shown that among women aged 15-49 and women aged 35-49, those using contraception have more children ever born than those not using contraception. This seemingly anomalous result is due to the fact that most women begin to use family planning after already having many births.

Women with primary education have the highest number of children ever born, followed by women with no education and women with secondary or higher education. The differences in fertility according to the husband's education follow the same pattern but are not statistically significant. Among women aged 15-49, the earlier they marry, the more children they have, net of other factors. Women whose husbands work in the non-agricultural sector are likely to have fewer children ever born than those whose husbands work in the agricultural sector.

Women with higher ideal numbers of children have many more children ever born than women with lower ideal numbers of children. The number of children ever born to women of North-Western and Western provinces is significantly lower than in other provinces.

The probability of having a birth in the two years before the survey (Table 7.2), a measure of current fertility, is significantly lower for women using contraception than for those not using. As age increases the probability of having a recent birth declines. Women with no education are more likely to have had a birth in the last two years than those with primary education and those with secondary or higher education. There are not significant differences in the probability of having a recent birth by husband's education or occupation, urban-rural residence, or ideal number of children.

7.3 RESULTS FROM THE MODEL ESTIMATING THE PROBABILITY OF MARRYING BEFORE 18 YEARS

The probability of marrying before age 18 decreases with increasing levels of women's and husband's education. An interesting finding is that the ideal number of children is not significant in influencing the probability of marrying before 18 years. However, women indicating higher ideal numbers of children are likely to have a high number of children ever born (Table 7.1). The implication is that women do not enter into marital unions to fulfil their desire for a certain number of children and that ideal numbers of children are conjured up within the marital union, most likely under the influence of kinship associations.

7.4 RESULTS FROM THE MODEL ESTIMATING THE PROBABILITY OF USING A CONTRACEPTIVE METHOD

The estimated probabilities of using a contraceptive method and not using a contraceptive method are shown in Table 7.3. The probability of using a contraceptive method is lower for women with higher ideal family sizes than for women with lower ideal family sizes. The probability of using a contraceptive method increases with age. Among the provinces, the probability of using a contraceptive method is highest for Northern and North-Western/Western provinces.

Table 7.1 Predicted number of children ever born, Zambia 1992

Characteristic	Predicted children ever born	
	All women 15-49 years	Women 35-49 years
Contraceptive use		
Using	3.94	5.22
Not Using	3.41	5.65
Residence		
Urban	3.49	5.25
Rural	3.48	5.32
Level of education		
None	3.41	5.27
Primary	3.55	5.36
Secondary/Higher	3.37	5.11
Education of husband		
None	3.43	5.26
Primary	3.51	5.30
Secondary/Higher	3.47	5.30
Age of woman		
17.5	0.41	2.91
22.5	2.14	3.71
27.5	3.50	4.36
32.5	4.50	4.51
37.5	5.14	4.85
42.5	5.42	5.20
47.5	5.34	5.43
Age at marriage		
15	3.82	5.47
17.5	3.41	5.33
22.5	2.62	4.82
Occupation of husband		
Non-agriculture	3.38	5.17
Agriculture	3.58	5.42
Ideal number of children		
0 to 4	3.26	5.11
5 and 6	3.48	5.19
7 and above	3.65	5.40
Province		
Central	3.41	5.12
Copperbelt	3.42	5.53
Eastern	3.56	5.22
Luapula	3.55	5.28
Lusaka	3.43	5.24
Northern	3.62	5.45
Southern	3.59	5.33
North-Western/Western	3.26	4.95

Table 7.2 **Estimated probabilities of marrying before 18 years and having a birth in the two years before the survey, Zambia 1992**

Characteristic	Probability of event	
	Marry before age 18	Have a birth within two years prior to survey
Contraceptive use		
Using		0.39
Not using		0.52
Children ever born		
0		0.01
1		0.04
2		0.11
3		0.29
4		0.56
5		0.80
6		0.93
7 and above		0.98
Residence		
Urban	0.76	0.39
Rural	0.72	0.43
Education		
None	0.78	0.48
Primary	0.79	0.40
Secondary/Higher	0.48	0.39
Education of husband		
None	0.78	0.40
Primary	0.76	0.43
Secondary/Higher	0.70	0.39
Age of woman		
17.5	0.76	0.98
22.5	0.73	0.88
27.5	0.71	0.57
32.5	0.71	0.20
37.5	0.72	0.05
42.5	0.74	0.01
47.5		0.01
Age at marriage		
15		0.99
17.5		0.44
22.5		0.67
Occupation of husband		
Non-agriculture	0.74	0.40
Agriculture	0.73	0.42
Ideal number of children		
0 to 4	0.70	0.43
5 and 6	0.75	0.41
7 and above	0.76	0.39
Province		
Central	0.72	0.46
Copperbelt	0.79	0.44
Eastern	0.72	0.36
Luapula	0.79	0.47
Lusaka	0.71	0.43
Northern	0.76	0.41
Southern	0.72	0.38
North-Western/Western	0.65	0.36

Table 7.3 Estimated probabilities of using or not using a contraceptive method, Zambia 1992

Characteristic	Probability of event	
	Using contraception	Not using contraception
Children ever born		
0	0.03	0.97
1	0.05	0.95
2	0.07	0.93
3	0.09	0.91
4	0.13	0.87
5	0.19	0.81
6	0.25	0.75
7 and above	0.34	0.66
Residence		
Urban	0.12	0.88
Rural	0.11	0.89
Education		
None	0.08	0.92
Primary	0.10	0.90
Secondary/Higher	0.21	0.79
Education of husband		
None	0.08	0.92
Primary	0.08	0.92
Secondary/Higher	0.11	0.89
Age of women		
17.5	0.14	0.86
22.5	0.11	0.89
27.5	0.09	0.91
32.5	0.07	0.93
37.5	0.06	0.94
42.5	0.05	0.95
47.5	0.05	0.95
Age at marriage		
15	0.12	0.88
17.5	0.08	0.92
22.5	0.10	0.90
Occupation of husband		
Non agriculture	0.12	0.88
Agriculture	0.11	0.89
Ideal number of children		
0 to 4	0.16	0.84
5 and 6	0.10	0.90
7 and above	0.09	0.91
Province		
Central	0.05	0.95
Copperbelt	0.09	0.91
Eastern	0.08	0.92
Luapula	0.06	0.94
Lusaka	0.11	0.89
Northern	0.12	0.88
Southern	0.06	0.94
North-Western/Western	0.12	0.88

8 Policy Implications of the Findings

The findings from these models have a number of policy implications. Details of population policies of Zambia can be found in the population policy document (Likwa, 1989). The findings from the models imply that strategies for the following policies should be implemented in the listed order of priority to sustain the fertility decline in Zambia.

(i) A strategy to promote the desire for small families should be high on the agenda. The models predicting the number of children ever born show that fertility intentions influence the number of children women will have and the likelihood of women demanding contraceptive methods in Zambia. Not much has been done to promote the "small is beautiful" norms of family size. This was the consensus of the InterAgency Technical Committee on Population which is responsible for implementing Zambia's population policy. High fertility intentions promoted through the African cultural context account for some of the failure of African countries family planning programmes in reducing fertility.

(ii) Messages discouraging large families should be targeted at primary school pupils as a special group. Currently, women whose highest level of education attainment is primary education are likely to have more children than women who have not attained any education or women whose highest level of education attained is secondary or higher.

(iii) Use of contraceptives should be encouraged among young women. It is too late to begin using contraceptives at older ages. Women using a contraceptive method at the time of the survey were less likely to have a birth in the two years before the survey. Thus, use of contraception lowers fertility but currently contraception is most likely to be used by older women who would already have had several children.

(iv) Female levels of education should be raised. In Zambia, high levels of female education have a greater impact on lowering fertility than high levels of male education. However, it should be noted that a female with primary education is likely to have more children ever born than a female without education. Thus, it appears that only education beyond the primary level has a negative impact on fertility.

(v) Although the government has succeeded in reducing the rate of urbanization (the female urban population only grew from 39 percent in 1980 to 41 percent in 1990) (CSO, 1991) it should be noted that urban dwellers are likely to have lower fertility as they marry later and are more likely to use a contraceptive method than rural women.

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Table A.1 Proportions and means of independent variables used in multivariate models

Independent variables	Ever married women age 15-49	Ever married women age 35+	Women age 18+
Not using contraception	0.86	0.84	
Urban	0.46	0.43	0.46
Education			
None	0.20	0.32	0.20
Secondary/Higher	0.19	0.15	0.20
Age	29.90	41.09	30.34
Age squared	968.67	1707.00	991.98
Education of husband			
None	0.10	0.16	0.10
Secondary/Higher	0.41	0.26	0.41
Non-agricultural occupation	0.45	0.51	0.55
Age at marriage	17.14	16.93	
Age at marriage squared	303.12	299.43	
Ideal number of children			
0-4	0.25	0.19	0.25
5-6	0.39	0.26	0.39
Province			
Central	0.09	0.09	0.09
Copperbelt	0.22	0.21	0.23
Eastern	0.12	0.11	0.11
Luapala	0.07	0.07	0.07
Lusaka	0.16	0.17	0.16
Northern	0.09	0.10	0.09
North-Western/Western	0.10	0.11	0.10
Children ever born	3.47		
Number of Cases	5279	1543	5108

Note: Values for omitted categories not shown.

Table A.2 **Coefficients of the multiple regression of children ever born to ever married women aged 15-49**

Independent variables	Coefficient	Standard error of the coefficient
Constant	-5.87	0.42
Not using	-0.52**	0.05
Urban	.01	0.05
Education		
None	-0.14**	0.05
Secondary/Higher	-0.17**	0.05
Education of husband		
None	-0.09	0.06
Secondary/higher	-0.04	0.04
Age	0.63**	0.01
Age squared	-0.007**	0.00
Age at marriage	-0.05	0.04
Age at marriage squared	-0.003**	0.00
Non agriculture	-0.20**	0.05
Ideal number of children		
0 to 4	-0.39**	0.05
5 and 6	-0.17**	0.04
Province		
Central	-0.18*	0.07
Copperbelt	-0.03	0.07
Eastern	-0.16*	0.07
Luapula	-0.03	0.07
Lusaka	-0.15*	0.07
Northern	0.03	0.07
North-Western/Western	-0.33**	0.07

r squared=0.66
* $p < .05$; ** $p < .01$

Table A.4 **Coefficients of the logistic regression of the probability of having a birth during the two years prior to the survey for ever married women aged 15-49**

Independent variables	Coefficient	Standard error of the coefficient
Constant	2.61**	0.95
Children ever born	1.16**	0.04
Using	-0.51**	0.10
Urban	-0.17	0.112
Woman's education		
None	0.34*	0.10
Secondary/Higher	0.03	0.10
Education of husband		
None	-0.13	0.12
Secondary/Higher	-0.14	0.09
Age	-0.47**	0.04
Age squared	0.002**	0.00
Age at marriage	0.40**	0.08
Age at marriage squared	-0.005*	0.02
Non agriculture	-0.06	0.09
Ideal number of children		
0 to 4	0.16	0.10
5 and 6	0.07	0.08
Province		
Central	0.34*	0.14
Copperbelt	0.26*	0.13
Eastern	-0.06	0.13
Luapula	0.37*	0.15
Lusaka	0.21	0.14
Northern	0.16	0.14
North-Western/Western	-0.09	0.14

* $p < 0.05$; ** $p < 0.01$

Table A.6 **Coefficients of the logistic regression of the probability of not using contraception for ever married women aged 15-49**

Independent variables	Coefficient	Standard error of the coefficient
Constant	3.14**	1.11
Children ever born	-0.39**	0.04
Urban	-0.09	0.13
Woman's education		
None	0.35*	0.14
Secondary/Higher	-0.84**	0.11
Education of husband		
No education	0.24	0.18
Secondary/Higher	-0.33**	0.11
Age	0.07	0.05
Age squared	-0.0005	0.0007
Age at marriage	-0.02	0.09
Age at marriage squared	-0.0003	0.002
Non agriculture	-0.14	0.12
Ideal number of children		
0 to 4	-0.65**	0.12
5 and 6	-0.13	0.11
Province		
Central	0.02	0.21
Copperbelt	-0.48**	0.17
Eastern	-0.41*	0.20
Luapula	0.05	0.23
Lusaka	-0.74**	0.17
Northern	-0.87**	0.19
North-Western/Western	-0.87**	0.19

* $p < 0.05$; ** $p < 0.01$

Table A.7 **Coefficients of the logistic regression of the probability of marrying before age 18 for women aged 18 and above**

Independent variables	Coefficient	Standard error of the coefficient
Constant	3.08**	0.50
Urban	0.18	0.10
Education		
No education	-0.05	0.10
Secondary/Higher	-1.39**	0.09
Education of husband		
No education	0.10	0.13
Secondary/Higher	-0.27**	0.09
Age	-0.10**	0.03
Age squared	0.001**	0.0005
Non agriculture	0.04	0.09
Ideal number of children		
0 to 4	-0.32**	0.09
5 and 6	-0.07	0.08
Province		
Central	0.07	0.14
Copperbelt	0.31*	0.13
Eastern	-0.005	0.13
Luapula	0.35*	0.16
Lusaka	-0.06	0.13
Northern	0.19	0.14
North-Western/Western	-0.37*	0.13

* $p < 0.05$; ** $p < 0.01$